NON-RESONANT RAMAN MICROSCOPY: IMAGING OF DNA AND PROTEIN DISTRIBUTIONS IN APOPTOTIC CELLS

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Non-resonant (647.1 nm excitation wavelength) confocal Raman imaging has been used to map the spatial distributions of the DNA, protein and phospholipids in the single human cells at the different stages of the cell cycle.
The protein distribution in the finally differentiated cells, peripheral blood lymphocytes, was obtained and compared to that in the active eye lens epithelial cells. The protein distributions in the cells with the different levels of metabolic activity had a completely different character [1].
The developed method was further applied to image directly (i.e. without prior labeling) the condensation of the nucleotides in the fragments of the apoptotic nucleus.
The non-resonant Raman images of the DNA and protein distributions in the apoptotic HeLa cells were obtained and compared with the images of the control, exponentially growing HeLa cells [2].

REFERENCES:

[1] N. Uzunbajakava; A. Lenferink; Y. Kraan; B. Willekens; G. Vrensen; J. Greve, and C. Otto, "Non-resonant Raman imaging of the protein distribution in single human cells", *Biopolymers (Biospectroscopy)*, **72**, 1-9 (2003).
[2] N. Uzunbajakava; A. Lenferink; Y. Kraan; E.Volokhina; G.Vrensen; J. Greve; and C. Otto, "Non-resonant confocal Raman imaging of DNA and protein distribution in apoptotic cells", *submitted to Biophys J.*